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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/679,168	10/06/2003	Richard Scott Bourgeois	130026	3956

6147 7590 07/25/2006

GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
PATENT DOCKET RM. BLDG. K1-4A59
NISKAYUNA, NY 12309

EXAMINER	
ECHELMEYER, ALIX ELIZABETH	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 07/25/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/679,168	BOURGEOIS ET AL.	
	Examiner	Art Unit	
	Alix Elizabeth Echelmeyer	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings filed on February 27, 2004 are acceptable for examination purposes.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claim 16 is rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the interconnect having a higher coefficient of thermal expansion than the brittle layer, does not reasonably provide enablement for the interconnect having a lower coefficient of thermal expansion than the brittle layer. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to alter the invention commensurate in scope with these claims, especially since a brittle layer having a coefficient of thermal expansion higher than the interconnect would cause the brittle layer to be in tension. For the purposes of this Office Action, the claim is being interpreted as claiming the interconnect with a higher coefficient of thermal expansion than the brittle layer.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 14 recites the limitation "said" in "pre-determined thickness". There is insufficient antecedent basis for this limitation in the claim, as the thickness is not discussed in previous claims. Further, it is unclear what thickness is being predetermined, though for the purposes of this Office Action it is being interpreted as the thickness of the brittle layer.

Claim Objections

6. Claim 16 is objected to because it includes reference characters that are not enclosed within parentheses.

Reference characters corresponding to elements recited in the detailed description of the drawings and used in conjunction with the recitation of the same element or group of elements in the claims should be enclosed within parentheses so as to avoid confusion with other numbers or characters which may appear in the claims. See MPEP § 608.01(m).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-4, 6, 8-11 and 14-21 are rejected under 35 U.S.C. 102(b) as being anticipated by Hsu (US Patent Number 4,721,556).

Hsu teaches an electrochemical converter using thin plates of solid oxide electrolyte and interconnectors. The assembly of the stack is designed to ensure that the brittle electrolyte layers remain in compression during operation of the cell (abstract).

The prestressed electrolyte plates are formed by heating the system, including the metal interconnect plates, to a temperature above the anticipated operating temperature of the system. The heating causes the plates to fuse together and the metal interconnect plates to expand, putting them in tension. When the assembly cools, the electrolyte plates experience in-plane compression due to the lower coefficient of thermal expansion (CTE) than the adjacent metal interconnects (column 3 lines 7-27; column 8 lines 14-33; Figure 7).

Regarding claims 1 and 21, Hsu teaches that compression is the favorable stress state for the ceramic electrolyte layers (column 3 lines 25-27). The metal interconnect plates induce stress on the ceramic layers.

As for claims 2 and 3, different materials have different expansion properties. If a uniaxial compression state was desired, a metal interconnect plate having significant expansion in only one direction could be selected, while if a biaxial compression state was desired, a metal interconnect plate meeting that requirement could be selected.

Regarding claims 4 and 6, the metal interconnect or stress inducer of Hsu is prestressed by heating during assembly of the stack. Since the metal interconnect is among several layers, it is attached to a layer other than the brittle layer on the other side of the plate than the interconnect layer.

Regarding claims 8-9 and 15, Hsu teaches that the CTE of both the electrolyte layer and the metal interconnect are known, and the CTE of the electrolyte layer is lower than that of the metal interconnect (Table I).

As for claims 10 and 16, Hsu teaches that the cell is formed at a temperature higher than the operating temperature of the system (column 3 lines 7-27). As for claim 11, the first coating of the brittle layer can be applied to the metal interconnect prior to heating to a temperature that would cause significant expansion (Figure 5).

Claim 14 is drawn to the ratio between the thickness and width of the brittle layer. Although the width of the layer is not clearly defined by Hsu, the specification gives ranges for the thickness in Figure 6. As seen in Figure 1, the ratio of thickness to width of the brittle layer is far lower than 1.

Claims 17-20 are drawn to a method for fabricating the brittle layer of the fuel cell. Hsu teaches also the methods for making the cell described above (column 1 lines 11-14; column 3 lines 7-27; column 8 lines 17-33).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 5, 7, 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu in view of Bothwell (US Patent 4,276,331).

The teachings of Hsu as discussed above are incorporated herein.

Hsu teaches the prestressed reinforcement structure and brittle layer but fails to teach a wire-structure, fiber structure, wire-mesh structure, or perforated sheet structure embedded in the brittle layer.

Bothwell teaches a metal grid coated with a ceramic slurry. The plate is then heated, putting the metal in tension. When the assembly cools, the tension on the metal is relieved and the ceramic is under compressive stress (column 2 lines 21-50).

Bothwell further teaches that the present invention fulfills the need for low cost thermal insulating materials with good structural mechanical strength, resistance to severe cracking due to thermal cycling and ample physical strength to withstand deterioration or attrition from exposure to hot gases.

It would have been advantageous to use the ceramic structure as taught by Bothwell in the cell taught by Hsu because the ceramic structure of Bothwell offers many advantages such as resistance to deterioration caused by exposure to hot gases as would occur in the operation of the cell of Hsu.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the ceramic structure of Bothwell in the cell of Hsu in order to increase the durability of the system.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alix Elizabeth Echelmeyer whose telephone number is 571-272-1101. The examiner can normally be reached on Mon-Fri 7-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Alix Elizabeth Echelmeyer
Examiner
Art Unit 1745

[redacted]

aee

GREGG CANTELMO
PRIMARY EXAMINER